



Beach COMBERS: Detecting Oiled Seabirds in the Monterey Bay

Kelly Newton¹, Scott Benson², Hannah Nevins², Andrew De Vogelaere¹, and James T. Harvey²

¹Monterey Bay National Marine Sanctuary, 299 Foam St., Monterey, CA 93940

²Moss Landing Marine Laboratories, 8272 Moss Landing Road, Moss Landing, CA 95039



Abstract

A beach monitoring study, utilizing volunteers to sample selected sections of beach for dead marine birds and mammals, was established within the Monterey Bay National Marine Sanctuary in February 1997. Nine beaches within Monterey Bay and one beach in Carmel Bay have been monitored monthly since May 1997. A stretch of sandy beach along the outer coast, north of Santa Cruz, has been monitored since September 1998. In May 2001, six new beach segments at the southern end of the Sanctuary were added. The primary goal of the program, designated Beach COMBERS (Coastal Ocean Mammal / Bird Education and Research Surveys), is to obtain information on rates of stranding for all species of marine birds and mammals in Monterey Bay. The long-term objectives of the program are to provide a baseline of information on the average presence of beachcast marine organisms and to assist the Sanctuary in early detection of mortality events triggered by natural and anthropogenic environmental perturbations such as red tides and oil spills. Pairs of trained volunteers survey their beach segment during the first week of each month at low tide. Beachcast seabirds are the most abundant organisms encountered during any beach survey. Average seabird deposition is greatest and most variable during the spring and summer months, and least during the winter months. Over the past 4 years there have been very few incidences of oiled birds found on surveyed beaches.



Figure 1. Study area and beach segments surveyed as part of the Beach COMBERS project.

Methods

The monitoring plan covered >50 km of sandy beach within and around Monterey Bay (Figure 1). Sampling involved pairs of trained volunteers surveying 11 pre-defined beach segments (ranging from 3.7 to 5.4 km in length) for beachcast birds and mammals. Monthly surveys were conducted during the first week of each month at low tide. Bi-monthly sampling began in October 1998 at beach segments 5 and 8. Encountered carcasses were identified to the lowest taxonomic order and recorded. One was clipped from encountered seabird carcasses to allow the determination of newly deposited birds and to assess the length of time birds remained on the beach. Other information recorded includes stage of decomposition, age and sex (when possible), evidence of scavenging, evidence for the cause of death, presence of oil, whether or not a photograph was obtained, and presence of identification tags or bands. If oil was present the extent of the oil and location of oil was recorded. Although additional beaches are monitored north of Santa Cruz and near Carmel, this analysis includes data from the ten beaches in the Monterey Bay area.



Acknowledgements

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C. Adams J. Crowley J. Jolly J. Patterson
J. Adams T. Darcy P. Kearby L. Perkins
P. Adams D. Evans M. Key J. Pettinger
J. Ames C. Ester A. King M. Phillips
J. Ballan K. Forney K. Krolowitz K. Pugliese
D. Bent N. Gong K. Koss C. Roberts
K. Blood D. Hall I. Laursen C. Roe
N. Bodorff H. Harris C. Maehr M. Roest
E. Burton M. Harris J. Makowka B. Schwefel
B. Burton B. Hatfield E. Massengill G. Seler
M. Chapla C. Haugen R. Massengill A. Sims
A. Chapman J. Hawkes D. Matterson G. Smith
M. Chechowitz W. Heady L. Neilsen H. Stead
S. Conners L. Henkel S. Oates K. Uschyk
A. Crews J. Hubbard R. Orr B. Voss
J. Crews M. Jacobi F. O'Sullivan J. Wolff
P. Wolff

Monthly Seabird Deposition in the Monterey Bay Area

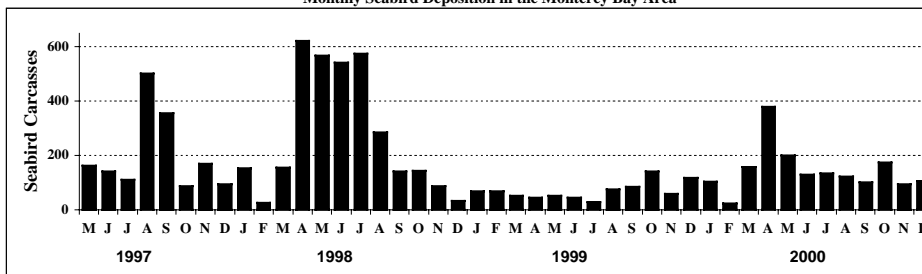


Figure 2. Monthly seabird deposition in the Monterey Bay area at beach segments 1-10.

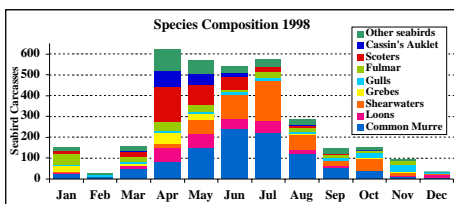


Figure 3. Species composition of beachcast seabirds encountered at Monterey Bay area beaches during 1998.

Seabird Deposition

- >1997 - Seabird deposition was relatively stable leading into and following a sharp peak during August and September that was dominated by Common Murres (*Uria adae*) (Figure 2).
- >1998 - Counts of beachcast marine birds were greater during 1998 compared to the previous year. The diversity of seabird species encountered beachcast was also greater during 1998. Surf Scoters (*Melanitta perspicillata*) dominated the beachcast assemblage during April and May. Common Murres and Sooty Shearwaters (*Puffinus griseus*) dominated the assemblage during June and July and comprised 46 percent of all beachcast seabirds for the year (Figure 3).
- >1999 - Seabird deposition was five times lower and less variable than during 1998 and was the lowest recorded during 1997 - 2000. Temporally, the greatest deposition occurred August through October and was dominated by Common Murres (Figure 2).
- >2000 - Counts of beachcast seabirds were more variable and over two times higher than during 1999, but lower than totals for 1997 and 1998. The greatest deposition occurred during April at beaches adjacent to Elkhorn Slough and was dominated by Western Grebes (*Aechmophorus occidentalis*) and Clark's Grebes (*Aechmophorus clarkii*) (Figure 2).

Monthly Oiled Seabird Deposition in the Monterey Bay Area

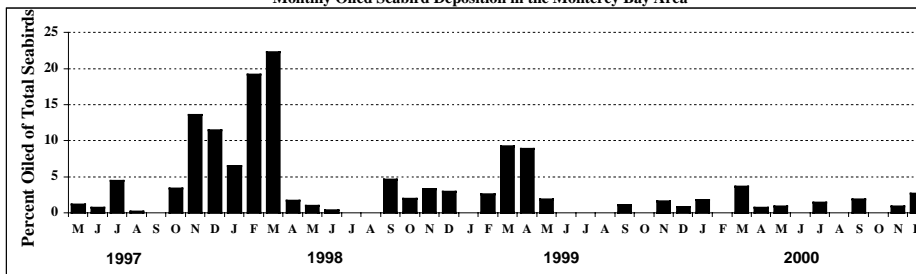


Figure 4. Monthly oiled seabird deposition in the Monterey Bay area at beach segments 1-10.

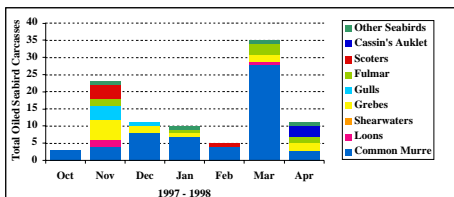


Figure 5. Composition of beachcast oiled seabirds in the Monterey Bay area during October 1997 - April 1998.

Percent Oiled vs. Non-Oiled Seabirds 1997-2000 in the Monterey Bay area at beaches 1-10

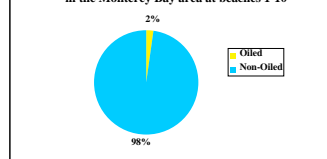


Figure 6. Oiled seabirds as a percent of all encountered beachcast seabirds 1997 - 2000

Oiled Seabird Deposition

- >The percent of oiled seabirds was greatest between October 1997 and April 1998 (Figure 4). The percent of oiled seabirds encountered on Monterey Bay beaches was less than 25% of the total encountered seabird carcasses during any one month (Figure 4).
- >In November 1997 a non-petroleum oiling event was detected by the Beach COMBERS program. This event affected a diverse assemblage of newly arrived migrant seabirds (Figure 5).
- >The 1997-1998 Point Reyes Tar ball Incident, documented by the United States Coast Guard and California Department of Fish and Game Office of Spill Prevention and Response, started in November 1997 and lasted until February 1998 (Figure 4 & 5). This event primarily affected Common Murres (Figure 5).
- >The percentage of oiled seabirds encountered was less than 2% (Figure 6).
- >The cause of oiling during non-peak events is currently unknown, however, natural oil seeps are known to exist offshore.
- >In March 2001 there was a large tar ball event that occurred on Monterey Bay beaches. Encountered tar balls were measured and collected by volunteers for analysis. At that time, very few oiled birds were found.
- >The most significant oiling event to date is presently underway. The San Mateo Mystery Spill began in November 2001 and birds are still being collected.

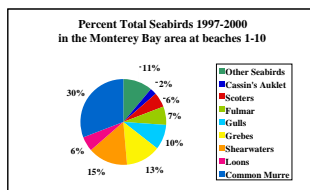


Figure 7. Beachcast seabird species composition 1997 - 2000

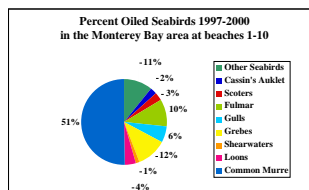


Figure 8. Beachcast oiled seabird species composition 1997 - 2000

Conclusions

- >Long-term monitoring can detect both natural and anthropogenic events.
- >Example events include set gill net mortality on Common Murres, El Niño, and toxic phytoplankton blooms.
- >Relative to other causes of carcass deposition, oiling had less impact.
- >Distribution of oiled seabirds on Monterey Bay beaches was greatest at south bay beaches, although oiled seabirds were also encountered at beaches in the north bay.
- >The percentage of oiled seabirds encountered on Monterey Bay beaches was significantly less than then previously documented by PRBO scientists during the 1970's and 80's.
- >The Gulf of the Farallones National Marine Sanctuary Beach Watch program, physically closer to San Francisco Bay, encountered many more oiled seabirds than the Beach COMBERS program.